ECE2 VACUUM FLUCTUATION THEORY OF PRECESSION AND LIGHT BENDING DUE TO GRAVITATION: REFUTATION OF THE EINSTEIN THEORY.

by

M. W. Evans and H. Eckardt,

Civil List and AIAS / UPITEC

(www.aias.us, www.upitec.org , www.et3m.net , www.archive.org, www.webarchive.org.uk)

ABSTRACT

It is shown that planetary precession and light bending due to gravitation can be explained straightforwardly with the ECE2 force equation and its vacuum force. The latter is due to isotropically averaged vacuum fluctuations, or fluctuations of spacetime. The Einstein theory of planetary precession is shown to be erroneous, because it incorrectly omits the geodetic and Lense Thirring precessions. When these are correctly considered, there is no agreement between the standard model of gravitation and data.

Keywords: ECE2 force equation, planetary precession, light bending, refutation of the Einstein theory.

UFT 406

1. INTRODUCTION

This paper develops the results of immediately preceding papers of this series {1 - 41} to show that the ECE2 force equation gives a straightforward description of planetary precession and light bending due to gravitation in terms of isotropically averaged vacuum fluctuations, or fluctuations of spacetime. In so doing it is shown that the usual description of precession in the standard model incorrectly omits consideration of planetary geodetic and Lense Thirring precession. When these are correctly considered there is no agreement between the Einsteinian general relativity (EGR) and the experimental claims about planetary precession. This leaves ECE and ECE2 unified field theory as the only correct theory of gravitation.

This paper is a short synopsis of the notes accompanying UFT406 on www.aias.us. Note 406(1) gives a simple solution for the precession calculated in the near circular approximation in immediately preceding papers. Note 406(2) gives tables of precessional data which show that the total observed precession in the outer planets is a factor of about a million greater than the theoretical result. So precession is a poor method of testing the claims of EGR, because the contribution of other planets dominates almost completely. Note 406(3) shows that the correct result of EGR theory must always be a sum of three terms: planetary, geodetic and Lense Thirring precessions, together with the usually reported result due to the force law of EGR When all three precessions are considered there is no agreement with experimental data. The latter are dubious because in the outer planets for example, the contribution of other planets is removed self inconsistently with Newtonian methods, and not with EGR, and would have to be removed with an accuracy of one part in a million. Note 406(4) gives the gravitomagnetic theory of geodetic and Lense Thirring precession, and is a development of UFT344 and UFT345. Notes 406(5) to 406(7) give the ECE2 theory of light deflection in terms of vacuum fluctuations.

2. REFUTATION OF EGR AND THEORY OF LIGHT DEFLECTION

In general the precession of any object of mass m around a spinning mass M can be deduced as in immediately preceding papers to be:

$$\Delta\phi = \frac{r^2}{2}\left(\frac{\omega}{r} - \frac{\partial\omega}{\partial r}\right) \quad -(1)$$

using the apsidal method in the near circular approximation. Here ω is the scalar magnitude of the spin connection vector $\underline{\omega}$. Eq. (1) has the simple solution:

$$\Delta\phi = r\,\omega(r). \quad -(2)$$

In general the ECE2 force equation is:

$$\underline{F} = -m\underline{\nabla}\phi_0 + m\underline{\omega}\phi_0 \quad -(3)$$

and ϕ_0 is the gravitational potential:

$$\phi_0 = -\frac{MG}{r}. \quad -(4)$$

From immediately preceding papers:

$$\omega = \frac{2}{3}\frac{\langle \delta\underline{r}\cdot\delta\underline{r}\rangle}{r^3} \quad -(5)$$

so the total or observed orbital precession is always expressible as:

$$\Delta\phi = \frac{2}{3}\frac{\langle \delta\underline{r}\cdot\delta\underline{r}\rangle}{r^2} \quad -(6)$$

in a nearly circular orbit such as those in the solar system. This result supercedes the obsolete theory of Einsteinian general relativity which produces the precession:

$$\Delta\phi_E = \frac{6\pi MG}{ac^2(1-\epsilon^2)} \quad -(7)$$

where a is the semi major axis and ϵ the eccentricity. In a revolution of 2π, EGR gives the precession (7) because the latter's force law is not the inverse square law needed for a closed orbit. Here M is the mass of the attracting object, G the Newton constant and c the constant speed of light.

However, Eq. (7) is not the only contribution to planetary motion in standard physics. There is also the geodetic precession and the Lense Thirring precession of planets. These are never considered when Eq. (7) is tested against data, an astonishing oversight. When they are correctly considered the standard model fails completely. This is easily shown as follows. The standard geodetic precession is the result of rotating the Schwarzschild metric and may be expressed as:

$$\Delta\phi_g = 2\pi\left(\left(1-\frac{v_1^2}{c^2}\right)^{-1/2} - 1\right) \quad -(8)$$

where:

$$v_1^2 = v^2 + \frac{2mG}{r}. \quad -(9)$$

In a roughly circular orbit the orbital linear velocity v is:

$$v^2 = \frac{mG}{r} \quad -(10)$$

where r is the distance from M to m. So:

$$v_1^2 = 3v^2. \quad -(11)$$

For:

$$v_1 << c \quad -(12)$$

Eq. (8) is:

$$\Delta\phi_g = \frac{6\pi m G}{2c^2 a} \quad -(13)$$

to an excellent approximation. The total theoretical precession from the standard model itself is therefore:

$$\Delta\phi = \Delta\phi_E + \Delta\phi_g = \frac{6\pi m G}{c^2 a}\left(\frac{1}{1-\epsilon^2} + \frac{1}{2}\right) \quad -(14)$$

and not Eq. (7). In addition there is a small and negligible contribution from the Lense Thirring precession of planets, denoted $\Delta\phi_{LT}$. So the correct result of the standard model itself is:

$$\Delta\phi = \Delta\phi_E + \Delta\phi_g + \Delta\phi_{LT} \quad -(15).$$

and clearly, this sum is always greater than $\Delta\phi_E$.

The standard model claim is that the experimentally observed precession is accurately described by Eq. (7). This claim is refuted completely by Eq. (15).

The tables in Section 3 show furthermore that the experimentally observed precessions of the planets is as much as a million times larger than the dogmatically repeated theoretical claim (7). The standard model self inconsistently {1 - 41} uses Newtonian methods to remove nearly all of the observed precession and compares what is left (denoted $\Delta\phi_{obs}$) with Eq. (7). However, it is difficult to find $\Delta\phi_{obs}$ in the literature, (see tables of Section 3) . Only $\Delta\phi_{obs}$ for the three inner planets are given by Marion and Thornton {1 - 41}, and $\Delta\phi_{obs}$ does not agree with $\Delta\phi_E$. In order to find $\Delta\phi_{obs}$ for the outer planets the contribution due to other planets must be removed with an accuracy of one part in a million. However, the reported uncertainty in the observed precession of the planets is orders of magnitude larger than one part in a million. Therefore there can be no confidence in the standard model and ECE2 proceeds by interpreting the total observed precession with Eq. (6).

Planetary precessions are due to isotropically averaged fluctuations of spacetime and to the ECE2 covariant force equation (3).

The same equation can be used to give a straightforward explanation of light deflection due to gravitation. Eq. (3) is one for the relativistic force:

$$\underline{F} = m \frac{d}{dt} \left(\gamma \underline{v}_N \right) = - m \underline{\nabla} \phi_0 + m \underline{\omega} \phi_0 \quad - (16)$$

where the relativistic velocity is:

$$\underline{v} = \gamma \underline{v}_N \quad - (17)$$

and where γ is the Lorentz factor:

$$\gamma = \left(1 - \frac{v_N^2}{c^2} \right)^{-1/2} . \quad - (18)$$

The radial component of Eq. (16) is:

$$\frac{d}{dt} \left(\gamma v_N \right) + \frac{\partial \phi_0}{\partial r} = \omega_r \phi_0 . \quad - (19)$$

In the limit:

$$\gamma \rightarrow 1 , \quad \omega_r \rightarrow 0 \quad - (20)$$

the Newtonian equivalence principle is obtained:

$$\frac{d v_N}{dt} + \frac{\partial \phi_0}{\partial r} = 0 \quad - (21)$$

i.e. :

$$\underline{F} = m \underline{\ddot{r}} = - m G \frac{\underline{r}}{r^3} \quad - (22)$$

The existence of the vacuum force:

$$\underline{F}(\text{vac}) = m\phi_0\,\underline{\omega} \quad -(23)$$

means that the Newtonian equivalence principle is replaced by:

$$\underline{F} = \gamma^3 m\,\underline{\ddot{r}} = -\frac{mMG\,\underline{r}}{r^3} + m\phi_0\,\underline{\omega} \quad -(24)$$

This is the equivalence principle of ECE2 relativity, a generally covariant unified field theory. From Eq. (17):

$$v^2 = \frac{v_N^2}{1 - \frac{v_N^2}{c^2}} \quad -(25)$$

so:

$$v_N^2 = \frac{v^2}{1 + \frac{v^2}{c^2}} \xrightarrow[v \to c]{} \frac{c^2}{2}. \quad -(26)$$

In ECE2 physics the Newtonian v_N^2 has an upper bound of:

$$v_N^2 \to \frac{c^2}{2} \quad -(27)$$

when the experimentally observable relativistic velocity v reaches c.

Note carefully that the velocity of the Lorentz factor is the Newtonian velocity $\underline{v}_N$ and that $\underline{v}_N$ is an observable only in the non relativistic limit. In all other circumstances the only observable is the relativistic velocity $\underline{v}$. This is a direct consequence of the Lorentz transformation itself.

The Newtonian theory of light deflection at the perihelion is given in UFT324 and is based on the conic section:

$$r = \frac{\alpha}{1 + \epsilon\cos\phi} \quad -(28)$$

where α is the half right latitude, and the Newtonian orbital velocity:

$$v_N^2 = mG\left(\frac{2}{r} - \frac{1}{a}\right). \quad -(29)$$

Here a is the semi major axis:

$$a = \frac{\alpha}{1-\epsilon^2} \quad -(30)$$

and R_0 is the perihelion or distance of closest approach:

$$R_0 = \frac{\alpha}{1+\epsilon}. \quad -(31)$$

It follows that:

$$v_N^2 = \frac{mG}{R_0}\left(1+\epsilon\right). \quad -(32)$$

In light grazing the sun:

$$\epsilon \gg 1 \quad -(33)$$

so:

$$\epsilon \sim \frac{R_0 v_N^2}{mG}. \quad -(34)$$

The angle of deflection of light at its closest approach to the sun is:

$$\Delta\phi \sim \frac{2}{\epsilon} = \frac{2mG}{R_0 v_N^2}. \quad -(35)$$

For a photon, the relativistic velocity approaches c, so:

$$v_N^2 \longrightarrow \frac{c^2}{2} \quad -(36)$$

and

$$\Delta\phi = \frac{4mG}{c^2 R_0} \quad -(37)$$

as in UFT324 and other UFT papers.

Eq. (37) is exactly the experimental result, which is known to high precision in contemporary experiments. So this is an exact experimental confirmation of the ECE2 force equation (24). The EGR explanation has been severely criticised in UFT150 to UFT155 and other UFT papers. The EGR explanation is obscure and uses several limiting assumptions. Again, EGR omits any consideration of geodetic and Lense Thirring effects whereas the ECE explanation depends only on the definition of relativistic velocity.

As the relativistic velocity approaches the speed of light it can no longer increase, so in Eq. (24):

$$\ddot{\underline{r}} \rightarrow \underline{0}. \quad -(38)$$

It follows that the scalar spin connection for light deflection due to gravitation is:

$$\omega_r = -\frac{1}{r}. \quad -(39)$$

If the force equation is defined as:

$$\underline{F} = -\underline{\nabla}\phi_0 - \underline{\omega}\phi_0 \quad -(40)$$

then:

$$\omega_r = \frac{1}{r} \quad -(41)$$

The use of a positive sign for ω_r is indicated in order to obtain a positive:

$$\frac{\langle \delta\underline{r} \cdot \delta\underline{r} \rangle}{r^2} = \frac{3}{2}. \quad -(42)$$

This result is interpreted as the maximum value attainable by the isotropically average vacuum fluctuation $\langle \delta\underline{r} \cdot \delta\underline{r} \rangle$, a value obtained when propagation takes place at the speed of light in vacuo . For Newtonian propagation the vacuum fluctuations vanish.

In previous work it has been shown that the relativistic Newtonian equation:

$$\gamma^3 \ddot{\underline{r}} = -mG\frac{\underline{r}}{r^3} \quad -(43)$$

produces a precessing ellipse. In the presence of a spin connection the radial part of Eq. (43) becomes:

$$\gamma^3 r = -\frac{mG}{r}\left(\frac{1}{r} + \frac{2}{3}\,\frac{\langle \delta \underline{r} \cdot \delta \underline{r} \rangle}{r^3}\right) \quad (44)$$

which gives $\langle \delta \underline{r} \cdot \delta \underline{r} \rangle$ in general by a numerical solution.

3. DISCUSSION, TABLES AND GRAPHICS

(Section by co author Horst Eckardt)

ECE2 vacuum fluctuation theory of precession and light bending due to gravitation: refutation of the Einstein theory

M. W. Evans*, H. Eckardt†
Civil List, A.I.A.S. and UPITEC

(www.webarchive.org.uk, www.aias.us, www.atomicprecision.com, www.upitec.org)

3 Discussion, tables and graphics

3.1 Precession of planets

We compare experiemtnal and calculated values of planetary precession. Experimental orbit data and measured precessions of planets are listed in Table 1. $\Delta\phi$(obs.) denotes the part of the precession which cannot be explained by impact of other planets, while $\Delta\phi_{tot}$(obs.) is the total measured precession, i.e. the real measured value. It can be seen that this is larger by a factor of 10 to 20 for the first three planets where it is known. The total observed $\Delta\phi$ does not increase significantly for the other planets although their masses are quite high (except Mars). This could be an effect of the very large orbit dimensions.

In Table 2 the computed precession values are listed. The parameters a (semi major axis) and T (orbit period) are given relative to the earth values, therefore we have to multiply a with the value a_E for the earth (in meters) and divide by the respective planetary orbit period to obtain the precession related to one earth year. From section 2 and earlier work we then have for the Einstein precession:

$$\Delta\phi_E = \frac{6\pi MG}{c^2 a(1-\epsilon^2)} \cdot \frac{1}{a_E T}, \tag{45}$$

for the geodetic precession:

$$\Delta\phi_g = 2\pi \left(\frac{1}{\sqrt{1-\frac{3M\,G}{c^2\,a\,a_E}}} - 1 \right) \cdot \frac{1}{T} \tag{46}$$

and for the Lense-Thirring precession:

$$\Delta\phi_{LT} = \frac{1}{2}\Omega\ \Delta t = \frac{1}{5}\frac{M\,G\,\omega_S\,{r_S}^2}{c^2\,a^3} \cdot \frac{T_E}{a_E^3} \tag{47}$$

*email: emyrone@aol.com
†email: mail@horst-eckardt.de

where Ω is the modulus of the gravitomagnetic field of the sun, r_S is the sun radius and ω_S is the angular velocity of sun rotation. Δt is the period where $\Delta\phi$ is related to, in this case one earth year. Obviously the geodetic precession is half of the Einstein value. This must be added to the latter to give the result of total precessions in Eq. (14) of section 2, providing that the Lense-Thirring contribution can be neglected which is obviously the case. This destroys the "good agreement" of experiment with Einstein.

Nr.	Name	a	T	ϵ	$\Delta\phi$(obs.)	$\pm$Dev.(obs.)	$\Delta\phi_{tot}$(obs.)
1	Mercury	0.3871	0.2408	0.2056	2.090E-6	2.182E-8	2.788E-5
2	Venus	0.7233	0.6152	0.0068	4.072E-7	2.327E-7	9.939E-6
3	Earth	1.0	1.0	0.0167	2.424E-7	5.818E-8	5.551E-5
4	Mars	1.5237	1.8809	0.0934			7.893E-5
5	Jupiter	5.2028	11.862	0.0483			3.176E-5
6	Saturn	9.5388	29.456	0.056			9.454E-5
7	Uranus	19.191	84.07	0.0461			1.619E-5
8	Neptune	30.061	164.81	0.01			1.745E-6
9	Pluto	39.529	248.53	0.2484			

Table 1: Experimental planetary data and precession data[1]; a and T in units relative to earth data, precessions in radians per earth year

Nr.	Name	$\Delta\phi_E$	$\Delta\phi_g$	$\Delta\phi_{LT}$	$\Delta\phi_{tot}$
1	Mercury	2.085E-6	9.987E-7	6.265E-11	3.084E-6
2	Venus	4.184E-7	2.092E-7	9.604E-12	6.276E-7
3	Earth	1.862E-7	9.309E-8	3.634E-12	2.793E-7
4	Mars	6.553E-8	3.248E-8	1.027E-12	9.802E-8
5	Jupiter	3.024E-9	1.508E-9	2.580E-14	4.532E-9
6	Saturn	6.647E-10	3.313E-10	4.187E-15	9.960E-10
7	Uranus	1.156E-10	5.770E-11	5.142E-16	1.733E-10
8	Neptune	3.758E-11	1.879E-11	1.338E-16	5.637E-11
9	Pluto	2.020E-11	9.476E-12	5.884E-17	2.967E-11

Table 2: Computed planetary precession data for Einsteinian, geodetic and Lense-Thirring precession in radians per earth year.

[1]see J. B. Marion and S. T. Thornton, "Classical Dynamics of Particles and Systems" (Harcourt Brace College Publishers, 1988, third edition), Tables 8-1 and 8-2; http://farside.ph.utexas.edu/teaching/336k/Newtonhtml/node115.html

3.2 Relation between velocities and relativistic γ factor

The relativistic γ factor is defined accoring to Eq. (18) by

$$\gamma = \frac{1}{\sqrt{1-\frac{{v_N}^2}{c^2}}} \tag{48}$$

where v_N is the non-relativistic Newtonian velocity. In the following we collocate the relations between v, v_N and γ which gives six equations. The relations between v and v_N are

$$v(v_N) = \frac{v_N}{\sqrt{1-\frac{{v_N}^2}{c^2}}}, \tag{49}$$

$$v_N(v) = \frac{v}{\sqrt{1+\frac{v^2}{c^2}}} \tag{50}$$

as plotted in Figs. 1 and 2 for $c = 1$. The value of c is indicated by a red line in all graphs where appearing. According to the ECE2 definition of the γ factor, the limits given in Eqs. (26) and (27) hold. When $v \to c$, we obtain $v_N \to c/\sqrt{2}$. There is no asymptote in this case, that means that superluminal motion is possible. There is an upper limit for v_N but not for the physical velocity v.

A similar result follows for v and the γ factor. The relations are

$$v(\gamma) = c\sqrt{\gamma^2-1}, \tag{51}$$

$$\gamma(v) = \sqrt{\frac{v^2}{c^2}+1} \tag{52}$$

as graphed in Figs. 3, 4. For $v = c$ we obtain $\gamma = \sqrt{2}$. There is no divergence of γ for $v \to c$. For high superluminal speeds, γ is in proportion to v.

The situation is different when inspecting $v_N(\gamma)$ and the reverse relation:

$$v_N(\gamma) = \frac{c\sqrt{\gamma^2-1}}{\gamma}, \tag{53}$$

$$\gamma(v_N) = \frac{1}{\sqrt{1-\frac{{v_N}^2}{c^2}}}, \tag{54}$$

see Figs. 5, 6. This is the usual definiton of the γ factor from standard physics, therefore it is always $v_N \leq c$ and γ goes to infinity for $v_N \to c$. These examples should have made evident the different asymptotic properties of v, v_N and γ.

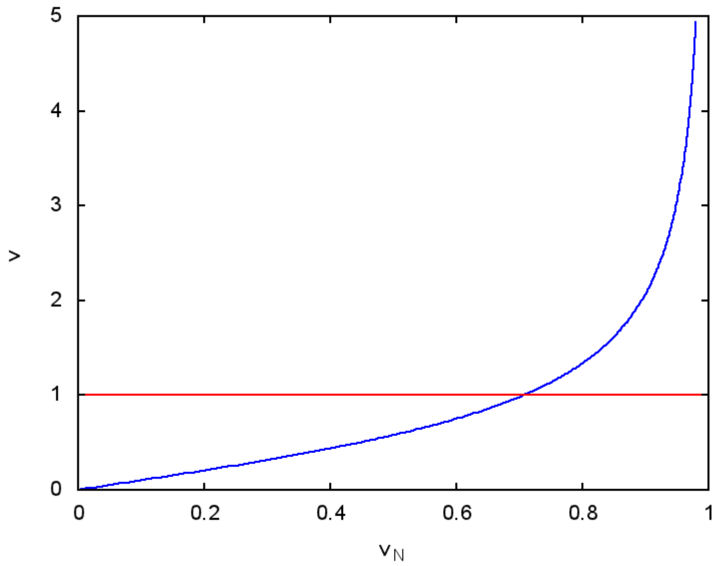

Figure 1: $v(v_N)$.

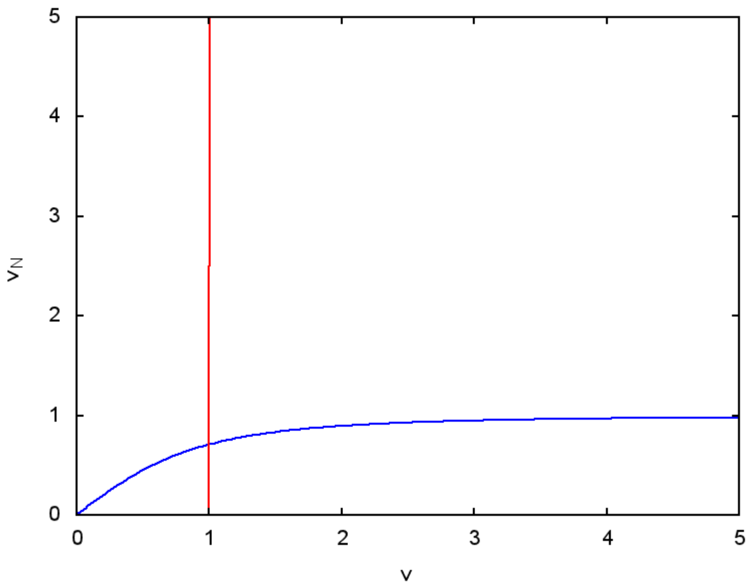

Figure 2: $v_N(v)$.

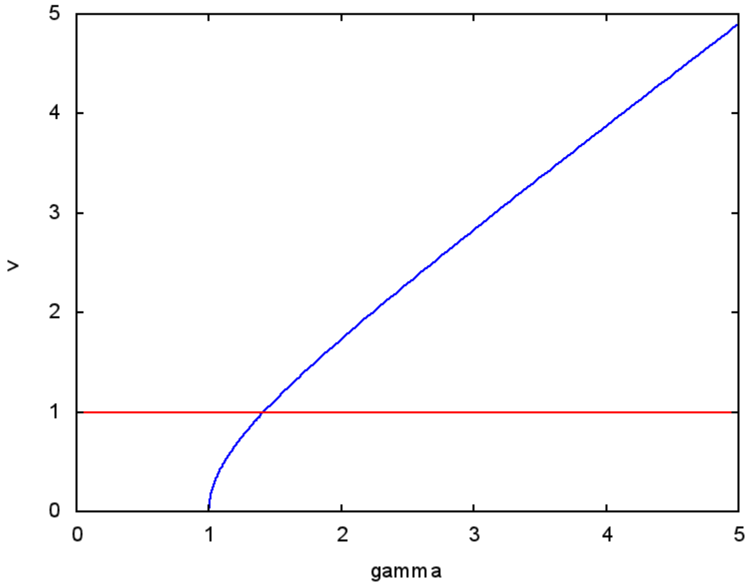

Figure 3: $v(\gamma)$.

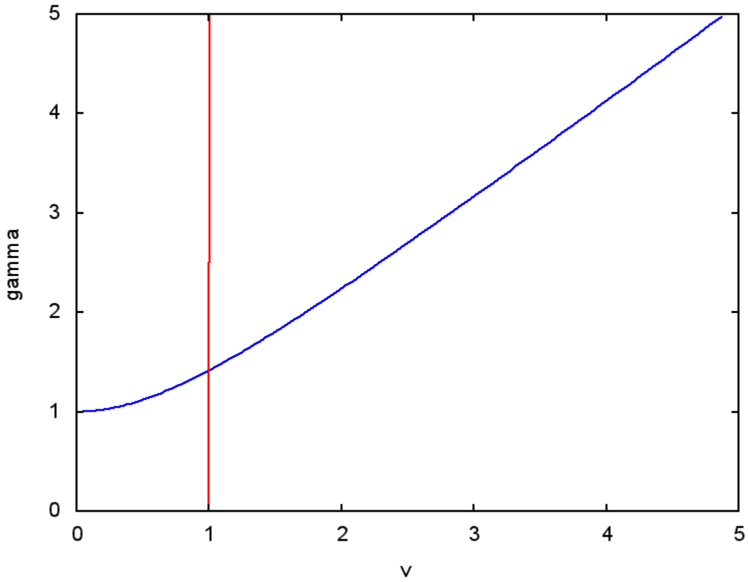

Figure 4: $\gamma(v)$.

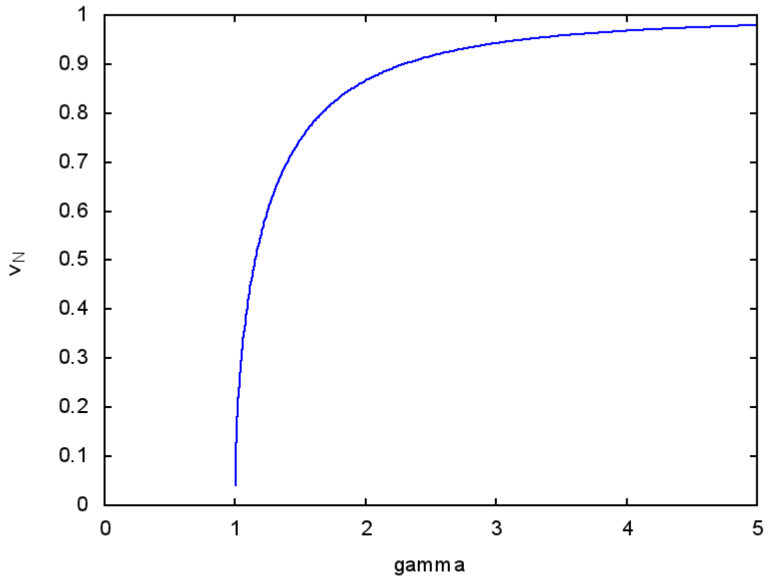

Figure 5: $v_N(\gamma)$.

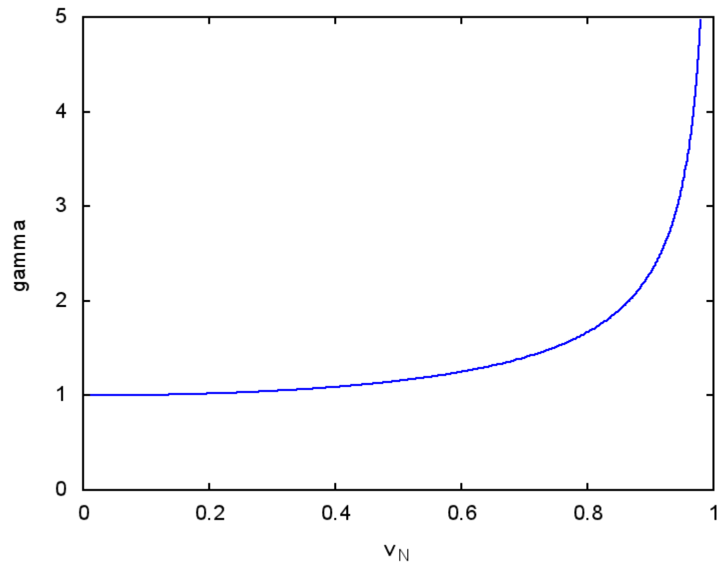

Figure 6: $\gamma(v_N)$.

ACKNOWLEDGMENTS

The British Government is thanked for a Civil List Pension and the staff of AIAS and others for many interesting discussions. Dave Burleigh, CEO of Annexa Inc., is thanked for voluntary posting, site maintenance and feedback maintenance. Alex Hill is thanked for many translations, and Robert Cheshire nd Michael Jackson for broadcasting and video preparation.

REFERENCES

{1} M. W. Evans, H. Eckardt, D. W. Lindstrom, D. J. Crothers and U. E. Bruchholtz, "Principles of ECE Theory, Volume Two" (ePubli, Berlin 2017).

{2} M. W. Evans, H. Eckardt, D. W. Lindstrom and S. J. Crothers, "Principles of ECE Theory, Volume One" (New Generation, London 2016, ePubli Berlin 2017).

{3} M. W. Evans, S. J. Crothers, H. Eckardt and K. Pendergast, "Criticisms of the Einstein Field Equation" (UFT301 on www.aias.us and Cambridge International 2010).

{4} M. W. Evans, H. Eckardt and D. W. Lindstrom "Generally Covariant Unified Field Theory" (Abramis 2005 - 2011, in seven volumes softback, open access in various UFT papers, combined sites www.aias.us and www.upitec.org).

{5} L. Felker, "The Evans Equations of Unified Field Theory" (Abramis 2007, open access as UFT302, Spanish translation by Alex Hill).

{6} H. Eckardt, "The ECE Engineering Model" (Open access as UFT203, collected equations).

{7} M. W. Evans, "Collected Scientometrics" (open access as UFT307, New Generation, London, 2015).

{8} M .W. Evans and L. B. Crowell, "Classical and Quantum Electrodynamics and the B(3) Field" (World Scientific 2001, open access in the Omnia Opera section of www.aias.us).

{9} M . W. Evans and S. Kielich, Eds., "Modern Nonlinear Optics" (Wiley Interscience, New York, 1992, 1993, 1997 and 2001) in two editions and six volumes, hardback, softback and e book.

{10} M. W. Evans and J. - P. Vigier, "The Enigmatic Photon" (Kluwer, Dordrecht, 1994 to 1999) in five volumes hardback and five volumes softback, open source in the Omnia Opera Section of www.aias.us).

{11} M. W. Evans, Ed. "Definitive Refutations of the Einsteinian General Relativity" (Cambridge International Science Publishing, 2012, open access on combined sites).

{12} M. W. Evans, Ed., J. Foundations of Physics and Chemistry (Cambridge International Science Publishing).

{13} M. W. Evans and A. A. Hasanein, "The Photomagneton in Quantum Field Theory (World Scientific 1974).

{14} G. W. Robinson, S. Singh, S. B. Zhu and M. W. Evans, "Water in Biology, Chemistry and Physics" (World Scientific 1996).

{15} W. T. Coffey, M. W. Evans, and P. Grigolini, "Molecular Diffusion and Spectra" (Wiley Interscience 1984).

{16} M. W. Evans, G. J. Evans, W. T. Coffey and P. Grigolini", "Molecular Dynamics and the Theory of Broad Band Spectroscopy (Wiley Interscience 1982).

{17} M. W. Evans, "The Elementary Static Magnetic Field of the Photon", Physica B, 182(3), 227-236 (1992).

{18} M. W. Evans, "The Photon's Magnetic Field: Optical NMR Spectroscopy" (World Scientific 1993).

{19} M. W. Evans, "On the Experimental Measurement of the Photon's Fundamental Static Magnetic Field Operator, B(3): the Optical Zeeman Effect in Atoms", Physica B, 182(3), 237 - 143 (1982).

{20} M. W. Evans, "Molecular Dynamics Simulation of Induced Anisotropy: I Equilibrium Properties" , J. Chem. Phys., 76, 5473 - 5479 (1982).

{21} M. W. Evans, "A Generally Covariant Wave Equation for Grand Unified Theory" Found. Phys. Lett., 16, 513 - 547 (2003).

{22} M. W. Evans, P. Grigolini and P. Pastori-Parravicini, Eds., "Memory Function Approaches to Stochastic Problems in Condensed Matter" (Wiley Interscience, reprinted 2009).

{23} M. W. Evans, "New Phenomenon of the Molecular Liquid State: Interaction of Rotation and Translation", Phys. Rev. Lett., 50, 371, (1983).

{24} M .W. Evans, "Optical Phase Conjugation in Nuclear Magnetic Resonance: Laser NMR Spectroscopy", J. Phys. Chem., 95, 2256-2260 (1991).

{25} M. W. Evans, "New Field induced Axial and Circular Birefringence Effects" Phys. Rev. Lett., 64, 2909 (1990).

{26} M. W. Evans, J. - P. Vigier, S. Roy and S. Jeffers, "Non Abelian Electrodynamics", "Enigmatic Photon V olume 5" (Kluwer, 1999)

{27} M. W. Evans, reply to L. D. Barron "Charge Conjugation and the Non Existence of the Photon's Static Magnetic Field" , Physica B, 190, 310-313 (1993).

{28} M. W. Evans, "A Generally Covariant Field Equation for Gravitation and Electromagnetism" Found. Phys. Lett., 16, 369 - 378 (2003).

{29} M. W. Evans and D. M. Heyes, "Combined Shear and Elongational Flow by Non Equilibrium Electrodynamics", Mol. Phys., 69, 241 - 263 (1988).

{30} Ref. (22), 1985 printing.

{31} M. W. Evans and D. M. Heyes, "Correlation Functions in Couette Flow from Group Theory and Molecular Dynamics", Mol. Phys., 65, 1441 - 1453 (1988).

{32} M. W. Evans, M. Davies and I. Larkin, Molecular Motion and Molecular Interaction in the Nematic and Isotropic Phases of a Liquid Crystal Compound", J. Chem. Soc. Faraday II, 69, 1011-1022 (1973).

{33} M. W. Evans and H. Eckardt, "Spin Connection Resonance in Magnetic Motors", Physica B., 400, 175 - 179 (2007).

{34} M. W. Evans, "Three Principles of Group Theoretical Statistical Mechanics", Phys. Lett. A, 134, 409 - 412 (1989).

{35} M. W. Evans, "On the Symmetry and Molecular Dynamical Origin of Magneto Chiral Dichroism: "Spin Chiral Dichroism in Absolute Asymmetric Synthesis" Chem. Phys. Lett., 152, 33 - 38 (1988).

{36} M. W. Evans, "Spin Connection Resonance in Gravitational General Relativity", Acta Physica Polonica, 38, 2211 (2007).

{37} M. W. Evans, "Computer Simulation of Liquid Anisotropy, III. Dispersion of the Induced Birefringence with a Strong Alternating Field", J. Chem. Phys., 77, 4632-4635 (1982).

{38} M. W. Evans, "The Objective Laws of Classical Electrodynamics, the Effect of Gravitation on Electromagnetism" J. New Energy Special Issue (2006).

{39} M. W. Evans, G. C. Lie and E. Clementi, "Molecular Dynamics Simulation of Water from 10 K to 1273 K", J. Chem. Phys., 88, 5157 (1988).

{40} M. W. Evans, "The Interaction of Three Fields in ECE Theory: the Inverse Faraday Effect" Physica B, 403, 517 (2008).

{41} M. W. Evans, "Principles of Group Theoretical Statistical Mechanics", Phys. Rev., 39, 6041 (1989).